



Docket No.: 300.1158

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of:

Yoji ASAH I et al.

Serial No. 10/827,318

Group Art Unit: 2893

Confirmation No. 4043

Filed: April 20, 2004

Examiner: TRINH, Hoa B.

For: SEMICONDUCTOR DEVICE SUBSTRATE

REPLY BRIEF UNDER 37 CFR §41.41

Mail Stop Appeal Brief-Patents
Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Entry of this Reply Brief is respectfully requested. This Reply Brief is submitted in response to the Examiner's Answer mailed May 7, 2009 ("Examiner's Answer") in reply to the Appeal Brief filed February 17, 2009 ("Appeal Brief").

If any fees are required in connection with this filing, please charge our Deposit Account No. 19-3935.

I. STATUS OF AMENDMENT

As of the filing of the Appeal Brief, i.e., February 17, 2009, the Amendment filed on December 17, 2008 ("Amendment") under 37 C.F.R. § 1.116 had not yet been acted upon by the Examiner.

An Advisory Action was mailed March 2, 2009, indicating that the Amendment will be entered, but does not place the application in condition for allowance.

II. STATUS OF CLAIMS

Claims 1-16 are rejected.

Claims 1-16 are being appealed.

Claims 1, 5, 9, 11, 13, 14, and 16 are independent claims, and claims 2-4, 6-8, 10, 12, and 15 are dependent claims.

III. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The first ground of rejection to be reviewed is whether claims 1-10 and 16 are properly rejected under 35 U.S.C. §103(a) as being unpatentable over Abe (U.S. Pub. 2003/0136577) ("Abe").

The second ground of rejection to be reviewed is whether claims 11-15 are properly rejected under 35 U.S.C. §103(a) as being unpatentable over Abe in view of Nair (U.S. Pub. 2004/0095734) ("Nair").

IV. REPLY ARGUMENT

A. First Ground Of Rejection - Rejection of Claims 1-10 and 16 under 35 U.S.C. §103(a) as being unpatentable over Abe

Beginning on page 7 of the Examiner's Answer, the Examiner is rebutting Appellant's argument from the Appeal Brief that recited claims 1-10 and 16 are patentable over Abe. Appellants submit that that the Examiner's Answer includes the following errors.

1) In item (10) A. of the Examiner's Answer, entitled "First Ground of Rejection ..., the Examiner asserts, regarding claim 1, for example, that:

Polyimide and epoxy resin materials in Abe possess the same characteristics of strength and/or elongation as recited in the claims of the present invention, because Abe and the present invention's materials (polyimide and epoxy resin) are the same.

(Emphasis added, see, for example, Examiner's Answer at page 8, lines 14-16).

Appellants submit that Abe does not specifically disclose characteristics of strength and/or elongation of polyimide and epoxy resin materials used. Thus, the Examiner's assertion is unsupported and in error.

2) The Examiner further asserts:

[T]he selection of materials for the inner layers and the outermost layer lies within one of ordinary skill in the art to choose the desired material from the list disclosed in table 1 of Abe for the appropriate use, because polyimide resin and epoxy resin are well known materials in the art to have the desired characteristics of strength and elongation given the material options available for the inner and outermost resin layers in Table 1 of Abe, the skilled artisan would have had good reason to try the epoxy resin material for the inner layers and the polyimide resin material for the outermost layer with a reasonable expectation of success.

(Emphasis added, see, for example, Examiner's Answer at page 8, lines 19-22).

However, Abe, in fact, teaches an adjustment of properties of a core layer by:

[C]arbon fibers arranged in the core layer include . . . carbon fiber groups which

are arranged in different direction to intersect each other, whereby a . . . strength of the core layer can be adjusted for arrangement directions of the first and the second carbon fiber groups by arranged amounts and cross angles of the first and the second carbon fiber groups. The . . . strength of the circuit board can be adjusted corresponding to electronic parts to be mounted.

(Emphasis added, See, for example, paragraph [0019]).

That is, Abe teaches away from using an arrangement of different layers of resin to address a strength concern, as the Examiner suggests. Rather, Abe teaches, instead, different compositions and rearrangements of carbon fibers, for example.

As upheld in *Ex Parte Jella* (BPAI Precedential Opinion):

Whether a reference teaches away from a claimed invention is a question of fact. In re Harris, 409 F.3d 1339, 1341 (Fed. Cir. 2005). "A reference may be said to teach away when a person of ordinary skill, upon reading the reference, . . . would be led in a direction divergent from the path that was taken by the applicant." In re Haruna, 249 F.3d 1327, 1335 (Fed. Cir. 2001) (quoting *Tec Air, Znc. v. Denso Mfg. Mich. Znc.*, 192 F.3d 1353, 1360 (Fed. Cir. 1999)).

(Emphasis added).

Further, Abe teaches:

The resin material forming the insulating layer 14 is suitably polyimide resin, but polyimide resin is not essential. The resin material can be a resin having good heat resistance and insulation, such as polyetherimide, polyethersulfone, epoxy resin, tetrafluoroethylene, polyurethane resin, silicone resin, acrylic resin, bismaleimide-triazine (BT) resin or others.

(Emphasis added, See, for example, paragraph [0063]).

That is, it is a fact that Abe teaches using carbon fibers to address strength. Further, Abe teaches selecting a resin based on heat resistance and insulation properties.

Thus, the Examiner's assertion that a "skilled artisan would have had good reason to try the epoxy resin material for the inner layers and the polyimide resin material for the outermost layer with a reasonable expectation of success" is in error. Thus, the rejection should be withdrawn.

3) The Examiner further states:

[E]ven if appellant had argued that the known resin materials were placed in such order that an unexpected result occurred, appellant's specification still fails to support such claim. In appellant's specification, para. [0017]-[0018], appellant merely attempts to provoke an unexpected result for the known materials by stating that experiments have been done regarding to the selection of the resin materials for the inner and outermost layers to show no cracks or degradation in the thermal test. . . . held that "conclusory statement in the specification does not suffice" regarding to any assertion of unexpected result.

(Emphasis added, See, for example, Examiner's Answer at page 9, lines 11-20).

Appellants submit that paragraphs [0017]-[0018] are not a "conclusory statement" as the Examiner asserts. Rather, for example, the unexpected results were determined using, as summarized in Table 1 of the specification, the types and characteristics of the materials "examined for the state of occurrence of cracks" after performance of a "thermal shock test." Thus, the Examiner's statement is in error

4) The Examiner further asserts:

[S]ome of the aspects of Abe's invention are to prevent deformation such as strains, bowing, etc. (Abe, p. 4, [0052], Table 1), and to provide rigidity and reliability in connection (Abe, p. 1, [0012], lines 4-5) between the board and the mounted circuit parts, which is in the same field of endeavors as that of the present invention.

(Emphasis added, See, for example, Examiner's Answer at page 9, line 21 - page 10 line 2).

But, Abe, in fact, discloses that prevention of deformation is performed since:

[L]ayer 101 is formed of the first and the second carbon fiber groups 102, 103 impregnated with the insulating resin 104, whereby . . . mechanical strength can be improved. Carbon fiber (the first carbon fiber group 102 and the second carbon fiber group 103) . . . has higher mechanical strength in comparison with the conventionally used core material (e.g., the glass epoxy resin). . . circuit boards 120A, 120B fabricated with the core layer 101 as a core material . . . and improved mechanical strength, whereby the generation of deformations (e.g., strains, bowing, etc.) of the circuit boards . . . can be prevented . . . core layer 101 can have . . . thermal expansion coefficient and the mechanical strength . . . adjusted by varying composition ratios of the carbon fibers (the first carbon fiber group 102 and the second carbon fiber group 103) and the insulating resin 104. Specifically, a content of the carbon fibers is increased with respect to a content of the insulating resin 104, whereby the thermal expansion coefficient can be lowered, and the mechanical strength can be improved. . . . preferably a content of the carbon fibers is within a 30-80 vol. % range. A thermal expansion coefficient and a mechanical strength of the core layer 101 can be adjusted also by weaving the first carbon fiber group and the second carbon fiber groups 102, 103.

(Emphasis added, see, for example, paragraphs [0115] -[0118]).

That is, Abe teaches addressing concerns with deformation by varying composition ratios of the carbon fibers.

Appellants submits that further experiments of varying "composition ratios" and swapping of layers would not have been obvious.

Conclusion

For at least the above reasons, the rejections of claims 1-10 and 16 are improper and should be withdrawn.

B. Second Ground Of Rejection - Rejection of Claims 11-15 under 35 U.S.C. §103(a) as being unpatentable over Abe in view of Nair

Beginning on page 12 of the Examiner's Answer, the Examiner is rebutting Appellant's argument from the Appeal Brief that recited claims 11-15 are patentable over Abe in view of Nair.

Appellant submits that that the Examiner's Answer includes the following errors. The Examiner asserts, regarding to claim 11, for example:

Nair discloses an analogous device having a core substrate 211 (fig. 2E) made of an iron- nickel alloy (see page 2, paragraph [0026]) for providing a high capacitance substrate. . . .obvious . . . to substitute the SiC material of the core substrate of Abe with the iron nickel alloy material, as taught by Nair, for providing the advantage as mentioned in the above. Hence, Nair cures the deficiency in Abe.

(Emphasis added, see, for example, Examiner's Answer, page 13, lines 2-6).

However, Abe, in fact teaches:

[T]he thermal expansion coefficients of . . . alloys, such as silicon steel, and a clad material, such as CIC, are substantially the same as the thermal expansion coefficient of silicon. However, they have large specific gravities and add weights unsuitably to be used in the circuit boards, which are processed with the large-sized cores included. Their Young's moduli of elasticity are not high, and large core substrate(s) undesirably have bowing and waves, which causes troubles in the build-up process and in mounting semiconductor elements.

(Emphasis added, see, for example, paragraph [0010]).

That is, Abe teaches away from using an iron nickel alloy material, as the Examiner suggests. Rather, Abe teaches, instead, a core substrate that is a fiber reinforced metal, and different compositions and rearrangements of a core by rearranging carbon fibers, for example.

As upheld in *Ex Parte Jella* (BPAI Precedential Opinion):

Whether a reference teaches away from a claimed invention is a question of fact. In re Harris, 409 F.3d 1339, 1341 (Fed. Cir. 2005). "A reference may be said to teach away when a person of ordinary skill, upon reading the reference, . . . would be led in a direction divergent from the path that was taken by the applicant." In re Haruna, 249 F.3d 1327, 1335 (Fed. Cir. 2001) (quoting *Tec Air, Znc. v. Denso Mfg. Mich. Znc.*, 192 F.3d 1353, 1360 (Fed. Cir. 1999)).

(Emphasis added).

Further, the Examiner's asserts:

With respect to appellant's argument (Br., p. 15) that Abe's core substrate is different from the present invention citing paragraph [0010] of Abe, the examiner notes that paragraph [0010] appears in the prior art discussion of Abe's invention which is not the invention of Abe. Abe teaches SiC as a core substrate material

having a heat expansion coefficient of 4 ppm/°C (Abe, p. 4, [0052], Table 1), which overlaps with the claimed range of 4-10 ppm/°C. Thus, Abe meets the core substrate limitation.

(Emphasis added, see, for example, Examiner's Answer at page 10, lines 5-10.

Appellants agree with the Examiner that paragraph [0010] appears in the prior art discussion of Abe's invention which is not the invention of Abe.

That is, it is a fact that Abe teaches that using a core such as proposed by Nair is unsuitable and undesirable. Thus, Nair does not cure the deficiency in Abe.

Conclusion

Thus, the rejections of claims 11-15 are improper and should be reversed.

CONCLUSION

In view of the foregoing remarks, Appellants submit that pending appealed claims 1-16 patentably distinguish over the relied upon prior art. Reversal of the Examiner's rejections is respectfully requested.

The Commissioner is hereby authorized to charge any additional fees required in connection with the filing of this Reply Brief to our Deposit Account No. 19-3935.

Respectfully submitted,
STAAS & HALSEY LLP

Date:

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